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AN ECONOMIC ANALYSIS
OF THE ANACONDA ALUMINUM
PLANT IN FLATHEAD COUNTY

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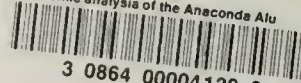
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An Economic Analysis
of the Anaconda Aluminum
Plant in Flathead County

Prepared
by
Norman J. Larson
Economist

Department of Intergovernmental Relations
Research and Information Systems Division
Helena, Montana

March
1974

PREFACE

The primary purpose of this report is to determine quantitatively the contribution of the Anaconda Aluminum reduction plant in Columbia Falls, Montana, to the economy in Flathead County. The contribution is measured in terms of the amounts of affected direct (in plant) and indirect (dependent local businesses) employment and earnings. Employment is defined as full and part time wage and salary and proprietary employment. Earnings include wages and salaries, other labor income (fringe benefits) and proprietors' income.

The first measurement task is to make a short-term projection of employment and earnings assuming the Flathead economy is functioning with the Anaconda Aluminum facility operating in it. Once affected direct and indirect employment and earnings are arrived at, they are subtracted from the projected total county employment and earnings to produce a view of the economy without the plant.

The methodology needed to measure the effects was designed to be used only in a situation where a reduction in the level of primary employment or earnings is under analysis. The methodology is contained in Technological Report PI 101 and it is available from this division of the Department of Intergovernmental Relations. This particular methodology is not applicable to the situation which an expansion in the level of primary employment or earnings is being analyzed. The expansion situation would require a different methodology with emphasis placed

on analysis of new inter-industry linkages, and the demands a new level of employment, income and people will make on physical facilities in the community.

The report has made no assumptions with regard to normative issues involved (what the company ought, or ought not to do at the plant). Indeed, implicit in the community economic analysis concept is that all plants and industries in any local economy are subject to supply-demand and cost-price considerations which may affect their ability to produce, hence affect the level of employment and earnings in an area.

The community economic analysis will simply provide the community (its people and institutions) with an estimate of the amount of employment and earnings attributable to any primary facility, be it the Anaconda Aluminum plant or any other primary industry in the state. Such analysis is a prerequisite for understanding both positive and negative aspects of economic growth within a local economy.

The report also makes some comparison of the Columbia Falls aluminum plant with other primary aluminum facilities in the U.S. However, an evaluation of plant competitiveness requires not only detailed information from the plant under analysis, but from competitor plants as well. For obvious reasons, companies have traditionally regarded this information as proprietary.

The data on costs of production voluntarily provided by the Anaconda Company for this study were at least as complete (if

not more so) as those that have been released by other aluminum companies for industry analysis. Even so, it is not possible from these data to make any substantive conclusions concerning profitability of the plant, and no attempt has been made to do so. However, assuming the rest of the aluminum industry is subject to the same current cost, and supply pressures as Anaconda Aluminum, the data can be used to make a general comparison of production costs at Columbia Falls with those in the primary aluminum industry.

Comparative evaluation helps to understand some of the factors that make possible the competitive production of aluminum in the Columbia Falls community. It also helps to show how marked changes in important production costs at this plant in relation to the rest of the primary aluminum producers can affect the Columbia Falls plant's comparative viability in the entire industry.

Should the demand arise, subsequent community analysis could be made of anticipated economic changes on income distribution, population, taxes, public agencies and institutions and the other sectors. All these facts would provide the community with more information about such issues as external costs associated with economic growth, existing human and labor market problems, structural balance and imbalance in a local economy and other economic, social and environmental pluses and minuses associated with a particular development.

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Conclusions

THE FLATHEAD COUNTY ECONOMY

The contribution of the Anaconda Aluminum Reduction plant in Columbia Falls to the Flathead County economy was more than just significant, it was very large. In 1973 \$32,966,635 in county earnings were related to the aluminum plant. The earnings were either directly earned by employees at the plant, or indirectly earned by people employed at firms the plant purchases from, or businesses at which plant employees purchase goods or services. The \$33 million in earnings represented 30.4% of the county's projected total 1973 earnings, or almost one out of three dollars earned in the county.

Some 2,499 people were found to be either directly employed at the plant or indirectly employed at businesses dependent on plant purchases and the purchases of its employees. This employment represented 16.1% of the total projected 1973 employment in Flathead County.

From an economic standpoint, Flathead County has in the Anaconda Aluminum plant a facility which rapidly expanded employment and earnings, a plant paying some of the highest wages in the state and an industrial operation which has added balance to an economy heavily dependent on the wood products industry.

THE ALUMINUM INDUSTRY, THE COLUMBIA FALLS PLANT AND
ANACONDA ALUMINUM

In the last year the domestic demand for primary aluminum has been strong, with aluminum prices firm and rising. Currently, the domestic primary aluminum industry is at 100% capacity, although because of its dependence on energy supply, it is peculiarly vulnerable to power supply reductions. The current domestic aluminum market can be described as a seller's market, and any planned reduction in aluminum supply under these circumstances does not appear economically realistic.

The Columbia Falls plant, in comparison with the rest of the domestic primary aluminum industry, appears to have substantial cost of production advantages in some cost sectors. In others, the advantages were less pronounced, and in still others it has distinct production-cost disadvantages. On balance, the plant was found to have medium to high costs of production in relation to other domestic primary aluminum facilities.

Lastly, the Anaconda Aluminum Company is a vertically integrated (mine to consumer) company, but until 1973 it was not totally integrated. Prior to 1973 it was forced to purchase primary aluminum on the open market. In 1973 the company brought into production another 120,000 tons of primary aluminum capacity at Sebree, Kentucky. This additional primary capacity, coupled with the Columbia Falls plant, made the company a net seller of primary aluminum and should put the aluminum company in a position to maximize its profits potential in the domestic aluminum industry.

It is recognized that the aluminum industry is subject to changes in technological innovations, in sources and costs of supplies and in competition from other materials. Unless general cost-price relationships within the industry, as well as those in this particular plant change appreciably, it appears reasonable to expect the Anaconda Aluminum Reduction plant to continue its sizable contribution to the Flathead County economy.

COMMUNITY ECONOMIC ANALYSIS

The Flathead County Economy -

INCOME GROWTH

The Flathead County economy is the sixth largest county economy in the state of Montana as measured by Personal Income. Of the state's major counties the Flathead economy had the 5th fastest growth rate in the state over the 1967-71 period, averaging 7.5% per year. (See Table 1)

While Personal Income growth has been generally strong, the county's economy has been subject to significant cyclical swings. In 1967-68 Personal Income increased by 13.8% while in the following year it grew by less than 1%. These changes can be attributed to earnings changes in several industries.

In 1968, Anaconda Aluminum was constructing additional facilities, and earnings in the contract construction industries from 1967 to 1968 were up 11.8%. Manufacturing earnings in the same years were up 20.6%. By 1969 the Anaconda construction was ending and contract construction earnings from 1968 to 1969 were down 12.3%. At the same time manufacturing earnings turned down by 5.6%.

Over the entire 1967-71 period the manufacturing industries have been largely responsible for most of the county's earnings growth. In the same period, total earnings grew by 29.1% while

TABLE 1

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR

FLATHEAD COUNTY, MONTANA

(THOUSANDS OF DOLLARS)

	1967	1968	1969	1970	1971
TOTAL PERSONAL INCOME	96,792	110,141	111,076	117,675	128,754
TOTAL WAGE AND SALARY					
DISBURSEMENTS	63,629	72,489	72,246	74,538	81,965
OTHER LABOR INCOME	3,423	4,148	4,203	4,660	5,504
PROPRIETORS INCOME	8,538	8,721	9,414	10,313	10,494
FARM PROPRIETORS INCOME	265	377	803	1,257	844
NON FARM PROPRIETORS INCOME	8,273	8,344	8,611	9,056	9,650
PROPERTY INCOME	15,041	17,797	17,486	18,228	19,255
TRANSFER PAYMENTS	9,848	11,099	12,170	14,610	16,718
LESS: PERSONAL CONTRIBUTIONS					
FOR SOCIAL INSURANCE	3,687	4,113	4,443	4,674	5,182
TOTAL EARNINGS	75,590	85,358	85,863	89,511	97,963
FARM EARNINGS	882	915	1,399	1,866	1,548
TOTAL NON FARM EARNINGS	74,708	84,443	84,464	87,645	96,415
GOVERNMENT EARNINGS	11,636	12,454	13,221	14,638	17,221
TOTAL FEDERAL	5,079	5,225	5,444	6,096	7,442
FEDERAL CIVILIAN	4,122	4,187	4,322	4,925	6,171
MILITARY	957	1,038	1,122	1,171	1,271
STATE AND LOCAL	6,557	7,229	7,777	8,542	9,779
PRIVATE NON FARM EARNINGS	63,072	71,989	71,243	73,007	79,194
MANUFACTURING	23,836	28,742	27,146	27,447	30,411
MINING	121	199	271	(D)	(D)
CONTRACT CONSTRUCTION	4,690	5,242	4,595	4,271	4,558
TRANS., COMM. &					
PUBLIC UTILITIES	9,886	10,689	11,323	11,323	11,851
WHOLESALE & RETAIL TRADE	13,120	14,678	14,667	15,434	16,179
FINANCE, INSURANCE, &					
REAL ESTATE	2,148	2,364	2,510	2,630	3,413
SERVICES	9,088	9,889	10,484	11,289	12,202
OTHER	183	186	247	(D)	(D)

MONTANA DEPARTMENT OF INTERGOVERNMENTAL
RELATIONS

(D) Not shown to avoid disclosure.

SOURCE: Regional Economics Information System, U. S. Department of
Commerce, Bureau of Economic Analysis

manufacturing earnings increased by 25.6%. At the same time, earnings in the Wood Products industry grew 37.3% and aluminum industry earnings by 67.6%.

The largest percentage earnings increase of the broad industry sectors in Table 1 occurred in farm earnings: 75.5% from 1967 to 1971. The second largest earnings increase was 58.9% in the finance, insurance and real estate sector, followed by government, 48% and the "Services" sector, 34.3%.

INCOME STRUCTURE

In dollars of earnings generated in manufacturing, the Flathead County economy was the third largest manufacturing economy in the state. In 1971, Yellowstone County had manufacturing earnings of \$37.1 million, Missoula County, \$32.7 million, and Flathead County, \$30.4 million.

Proportionately, manufacturing is much more important in Flathead County than it is statewide. The County's manufacturing industries generated 31.4% of county earnings in 1971. In the same year, statewide, Montana Manufacturing Industries generated only 10.2% of the total state earnings.

The two most important manufacturing industries in Flathead County are the Wood Products and Primary Metals (aluminum) manufacturing industries. Wood Products represents 52.7% and Primary Metals, 33.4% of the total 1973 manufacturing earnings in the County.

The second largest generator of earnings in Flathead County was government: 17.1% in 1971. The other industry sectors as a percent of total 1971 earnings in Flathead County, were wholesale-retail trade, 16.52%; services, 12.46%; transportation, communication and public utilities, 12.1%; contract construction, 4.65%; finance, insurance and real estate, 3.48%; and farm, 1.58%.

EMPLOYMENT GROWTH

Over the entire 1967-71 period total employment in the county grew by only 3.2%, slightly slower than the 4.2% statewide employment increase. During this period full and part time employment growth in Flathead County was characterized by cyclical change. From 1967 to 1968 total employment grew by 2.5%, from 1968 to 1969 it declined by 2.6%, and from 1969 to 1970 it declined another 0.3%. (See Table 2)

Again, cause for the cyclical changes can be attributed to several industries in the county. In the 1967-68 period construction employment (primarily heavy construction) grew by 11.1% and manufacturing by 5.8%. Employment in the next year (68-69), declined by 21.8% in construction and 9.7% in manufacturing. The 1969-70 period witnessed employment in the same industries declining by 13.1% and 3.7% respectively.

From 1967 to 1971 total employment in the manufacturing sector declined by 0.9%. In the same period, wood products employment grew by 2.9% and primary metals manufacturing (aluminum) by 30.7%.

TABLE 2

EMPLOYMENT BY TYPE AND BROAD INDUSTRIAL SOURCES ;
 FULL AND PART TIME WAGE AND SALARY EMPLOYMENT ;
 PLUS NUMBER OF PROPRIETORS

FLATHEAD COUNTY, MONTANA

(TOTALS)

	1967	1968	1969	1970	1971
TOTAL EMPLOYMENT	14,519	14,876	14,488	14,453	14,983
NUMBER OF PROPRIETORS	2,698	2,650	2,693	2,708	2,719
FARM PROPRIETORS	1,032	977	927	916	897
NON FARM PROPRIETORS	1,666	1,673	1,766	1,792	1,822
WAGE AND SALARY EMPLOYMENT	11,821	12,226	11,795	11,745	12,264
FARM	194	167	164	163	180
NON FARM	11,627	12,059	11,631	11,582	12,084
GOVERNMENT	2,040	2,031	2,023	2,137	2,263
TOTAL FEDERAL	665	627	608	633	680
FEDERAL CIVILIAN	579	536	522	553	598
MILITARY	85	91	86	80	82
STATE AND LOCAL	1,375	1,404	1,415	1,504	1,583
PRIVATE NON FARM	9,587	10,028	9,608	9,445	9,821
MANUFACTURING	3,403	3,600	3,252	3,135	3,373
MINING	12	17	27	(D)	(D)
CONSTRUCTION	570	633	495	430	454
TRANS., COMM., &					
PUBLIC UTILITIES	1,203	1,224	1,225	1,159	1,108
TRADE	2,452	2,629	2,622	2,632	2,706
FINANCE, INSURANCE &					
REAL ESTATE	298	308	336	343	414
SERVICES	1,577	1,569	1,590	1,655	1,713
OTHER	72	48	61	(D)	(D)

MONTANA DEPARTMENT OF INTERGOVERNMENTAL
 RELATIONS

(D) Not shown to avoid disclosure.

SOURCE: Regional Economics Information System, U. S. Department of
 Commerce, Bureau of Economic Analysis

The fastest employment growth occurred in the finance, insurance and real estate sector, 39.0 over the 1967-71 period. One of the largest declines, 13.1% over the same period, in the county employment occurred in the number of farm proprietors.

EMPLOYMENT STRUCTURE

The largest share of full and part time employment in Flathead County was found in the manufacturing industry, 22.5%, in 1971. The other significant employment sectors as a percentage of total employment in 1971 were: wholesale-retail trade, 18.1%; government, 15.1%; services, 11.4%; transportation, communication and public utilities, 7.4%; and farm employment, 6.29%. Non-farm proprietors made up 12.2% of total full and part-time employment.

In the manufacturing sector 83% of the sector's employment can be attributed to Wood Products and Primary Metals manufacturers (aluminum). Wood Products had 54.7% of the total and Primary Metals 28.3%.

In the wholesale-retail trade sector the largest employment areas are food retailing, eating and drinking places, automotive dealers and service stations, wholesale-trade, and retail general merchandise. The service sector major employment is in medical and other health services (hospitals, doctors, etc.) and in hotels and other lodging places.

WAGES PER EMPLOYEE

In 1971, average wages and salaries per wage and salary employee for all industries in the United States was \$7,444, in Montana, \$6,359, and in Flathead County, \$6,684. Flathead County wages per employee for all industries were 5.1% higher than the Montana figure and 11.4% below the national average.

The Montana Primary Metals manufacturing industry (copper, lead, zinc, and aluminum) had average wages per employee of \$7,929 in 1971, some 24.7% higher than the statewide figure for all industries. The highest wages per employee for the entire Montana Primary Metals manufacturing, \$9,137, was paid in the Flathead County aluminum industry, in 1971. This is some 15.2% higher than the Montana Primary Metals manufacturers average, 43.7% higher than wages per employee for all Montana industries, and 36.7% higher than wages per employee in all industries in Flathead County.

The Primary Metals wages per employee in the county was above the average manufacturers' wages per employee, but below that in the transportation, communication and public utilities industry. In 1971 wages per employee in the Flathead County manufacturing industry (including aluminum) was \$8,129. In the same year Wood Products had \$8,105 per employee and transportation, communication and public utilities sector \$9,616 per employee.

With and Without the Anaconda Company

This portion provides an economic model of the Flathead County

TABLE 3

Computation of Affected Earnings and Employment
In Flathead County

	<u>1973</u>	<u>1974*</u>
Primary or Export Earnings		
Anaconda Aluminum(1)	\$ 12,096,812	\$ 12,096,812
Multiplier Ratio	1:1.7087	
Secondary or Non-Export Earnings	\$ <u>20,669,823</u>	\$ <u>20,669,823</u>
Total Affected Earnings	\$ <u><u>32,766,635</u></u>	\$ <u><u>32,766,635</u></u>
	<u>1973</u>	<u>1974</u>
Primary Export Employment		
Anaconda Aluminum(2)	849	849
Multiplier Ratio	1:1.9436	
Secondary or Non-Export Employment	<u>1,650</u>	<u>1,650</u>
Total Affected Employment	<u><u>2,499</u></u>	<u><u>2,499</u></u>

(1) Includes Wages and Salaries and Wage Supplements, 1973.

(2) Average Annual Employment For 1973.

*Data from 1973 were the latest available from Anaconda Aluminum. In lieu of the 1974 data, 1973 data was used in the 1974 calculations.

economy with and without the Anaconda Aluminum Company operating in it. Its purpose is to measure the contribution of the plant to the local economy.

THE WITH PROJECTION

The analysis with Anaconda in the Flathead County economy involves a short-term projection of earnings and employment.¹ The assumptions underlying the "with" projection are that the economy will grow basically as it has in the past and that there will be no major alteration in the various economic sectors (the structure) of the Flathead Economy.

Projected Flathead County earnings were \$102,415,000 in 1972, \$107,701,010 in 1973 and \$112,987,000 in 1974. (See Figure 1) Employment was projected to 15,160 in 1972, 15,560 in 1973 and 16,060 by 1974 (See Figure 2). The dashed line on both graphs indicates projected levels of earnings and employment.

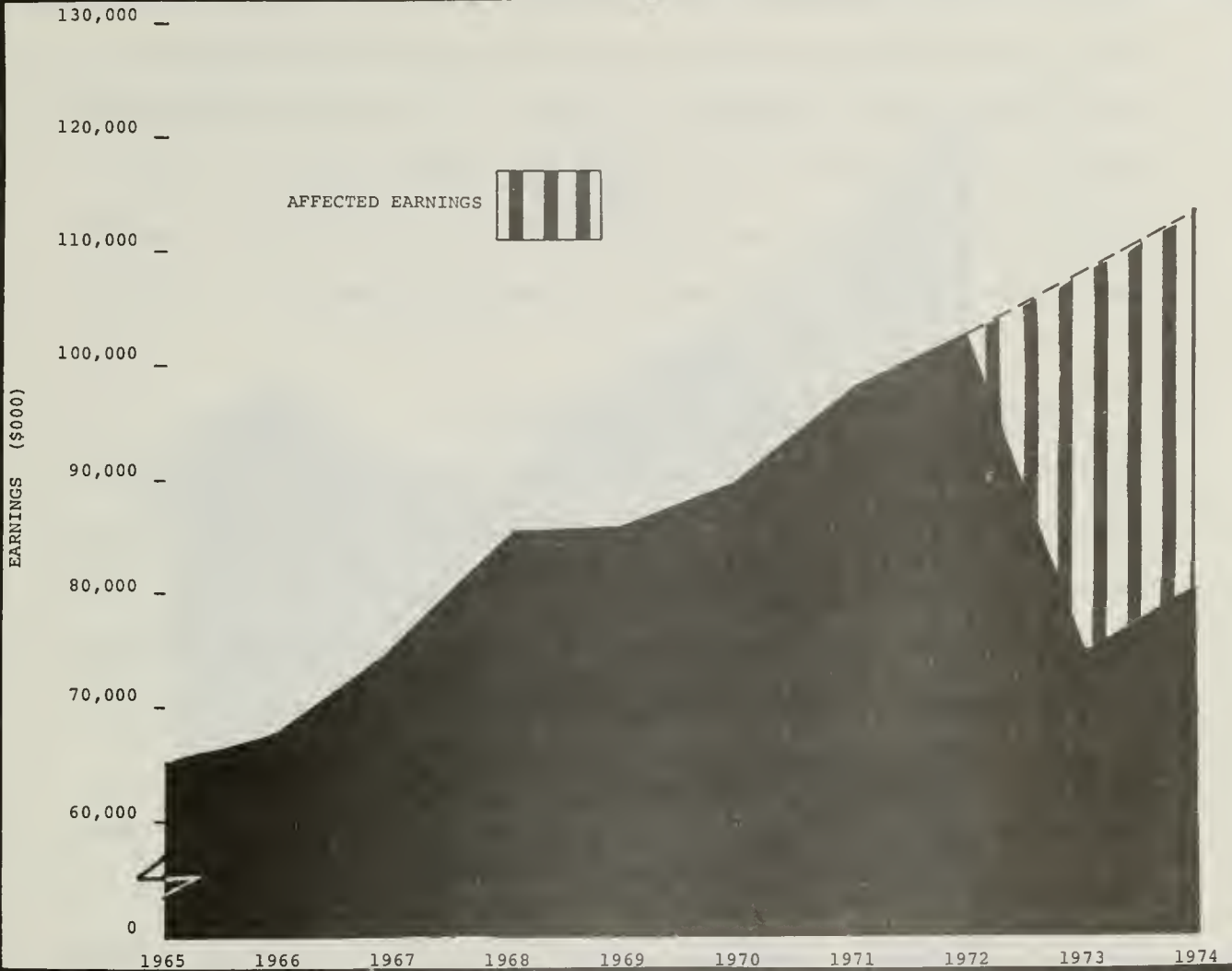
THE ASSUMPTIONS

To determine the economic impact on the country's economy it was necessary to calculate the amounts of direct (in plant) and indirect (dependent local businesses) employment and earnings.² (See Table 3) Measurement of the effects of the plant

¹The linear least squares method was used in the earnings projection while the employment projection required a least squares parabola.

²The methodology used to calculate the multiplier value can be found in the Department of Intergovernmental Relations PI 101. The multiplier calculation involves the use of maximum industry detail (2 digit S.I.C. Code by county) of earnings and employment and a location quotient methodology. These are used to determine the county export base from which an export industry multiplier is calculated.

FIGURE 1
FLATHEAD COUNTY EARNINGS, 1965 - 1974



	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Earnings	\$65,938,000	\$68,675,000	\$75,590,000	\$85,358,000	\$85,863,000	\$89,511,000	\$97,963,000
	<u>1972</u>	<u>1973</u>	<u>1974</u>				
Projected Earnings	\$102,415,000	\$107,701,000	\$112,987,000				
Affected Earnings		\$32,766,635	\$32,766,635				
Projected Earnings Without Anaconda Aluminum		\$74,934,365	\$80,220,365				

Projections are based on U.S. Department of Commerce, Bureau of Economic Analysis data.

on the Flathead economy required that an assumption be made as to when the plant would cease operations. The assumption was made that the plant would cease operations before January 1, 1973, and that all personnel would no longer be employed as of that date. This assumption was made to facilitate presentation and was not intended to simulate any actual situation. The assumption simply allows a measurement of the plant's contribution to the Flathead county for one full year.

AFFECTED EMPLOYMENT AND EARNINGS

In 1973 there were 849 people directly employed at the plant. (See Table 3) Employment in local businesses dependent on the plant (indirect) amounted to an additional 1,650 people.³ The total Flathead County employment (direct and indirect) related to the Anaconda Aluminum plant numbered 2,499 people in 1973.

The aluminum plant in 1973 directly paid \$12,096,812 in wages and salaries and wage supplements to its employees. (See Table 3) The amount of indirect 1973 earnings related to the plant were \$20,669,823.⁴ The total 1973 county earnings (direct and indirect) attributable to the plant amounted to \$32,766,635.

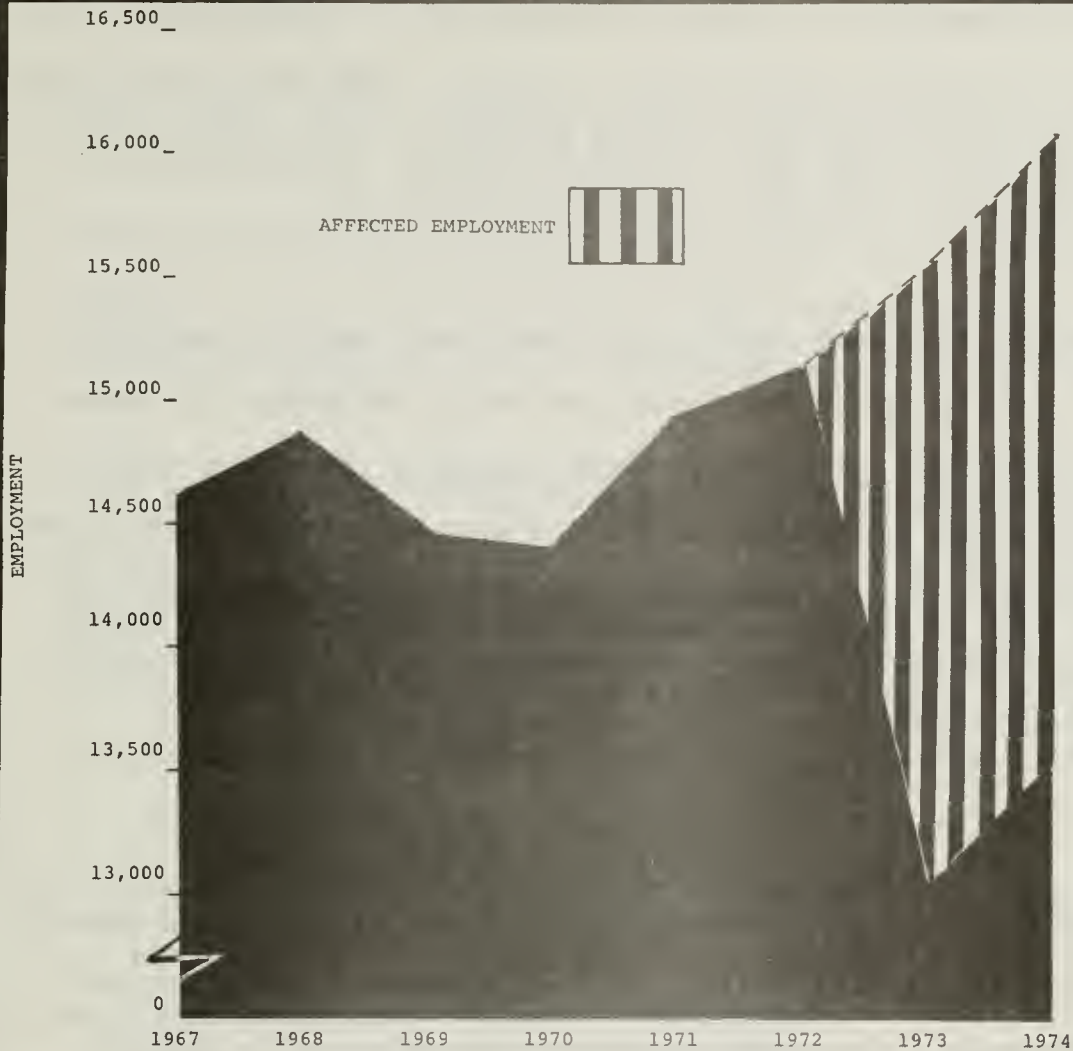
THE WITHOUT PROJECTION

Earnings in 1973 with the plant operating were projected to

³ Employment includes full and part time wage and salary employment as well as proprietors of non-incorporated businesses.

⁴ Indirect earnings includes the wages and salaries and wage supplements paid by, and the net income received by non-incorporated businesses dependent on direct plant purchases of its employees.

FIGURE 2
FLATHEAD COUNTY EMPLOYMENT, 1967 - 1974



	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Employment	14,519	14,876	14,488	14,453	14,983
	<u>1972</u>	<u>1973</u>	<u>1974</u>		
Projected Employment	15,160	15,560	16,060		
Affected Employment		2,499	2,499		
Projected Employment Without Anaconda Aluminum		13,061	13,561		

Projections are based on U.S. Department of Commerce, Bureau of Economic Analysis data.

be \$107,701,000. Assuming the plant ceased operation January 1, 1973, and all employment, earnings payments and purchases by the plant ceased by the date, Flathead County earnings would be \$74,934,365 in 1973, \$32,766,635, or 30.4%, less than they would be with the plant operating. (See Figure 1) Earnings in 1974 without the plant operating would be \$80,220,365.

Employment in Flathead County with the plant was projected to be 15,560 people in 1973. Under the same assumption as above, projected Flathead County employment without the plant operating would bring employment in 1973 down to 13,061 people, 2,499 or 16.1%, fewer people employed than if it were operating (See Figure 2). Flathead County employment without the plant would be 13,561 in 1974.

Summary

The Columbia Falls Aluminum Reduction plant is Montana's second largest manufacturing facility (after Anaconda Copper in Anaconda, Montana). The contribution of the plant, its direct and indirect effects, on the Flathead County economy is very large. At least 16 % of the people employed in the County are directly or indirectly attributable to the Columbia Falls plant. Some 30.4% of the total earnings in the county are either directly or indirectly attributable to the Columbia Falls plant.

The Flathead County manufacturing industry would again become almost exclusively a Wood Products industry without the Aluminum

industry. In 1971, 28% of the manufacturing employment and 31.4% of the manufacturing earnings were directly attributable to the aluminum plant.

While county total employment and earnings growth has grown at 3.2% and 29.1% respectively over the 1967-71 period, the same two measures have grown very rapidly at the aluminum facility. In the same period Flathead County aluminum industry employment expanded by 30.7% and earnings by 67.6%.

Wages per employee in the Flathead County Aluminum industry are highest in the county manufacturing sector and among the highest in the manufacturing sector statewide. In 1971, the average aluminum wage per employee was \$9,137. This was 43.7% higher than the average wage per employee for all Montana industries and 36.7% higher than the average wage per employee for all industries in the county. The aluminum wage per employee was 15.2% more than the average wage per employee in the Primary Metals manufacturing industry statewide.

Thus, from an economic standpoint, Flathead County has in the Anaconda Aluminum Reduction plant, a facility which expanded employment and earnings over the years, a high wage industry and one which has added balance to an economy heavily dependent on the Wood Products industry.

Introduction

This section will describe the purchases, sales, and the components used in calculating value added of the Anaconda Aluminum plant in Columbia Falls. Emphasis has been placed on the geographic orientation of purchases and of sales, which allows a more complete appraisal of the local economic contribution.

The section also includes a comparison of certain costs of production at the Columbia Falls plant, with those in the rest of the industry. The analysis is subject to data limitations described below, and to the fact that some of the information used for industry-wide comparison is not as current as that for the Anaconda plant. This discussion provides only a general indication of the relative efficiency of the plant, and is not a measure of its profitability.

THE DATA

All of the data on the Anaconda Aluminum Company Columbia Falls plant were furnished by the Columbia Falls facility. The information was largely internal cost accounting data. While it was more complete than any other public information available on the plant, it was not all of the information pertinent to the facility. For example, sales and some cost data appeared to reflect intra-company pricing, while capital costs, income tax and corporate profits data were not included.

The cost data are accurate, but they are so within a cost accounting context, rather than a profits, or tax accounting context. Depreciation, for example, is the book value depreciation rather than the profit or tax value depreciation. To obtain complete corporate accounting data requires access to the complete accounting records at the Anaconda Aluminum Company in Louisville, Kentucky. Access to such confidential information is granted to only a few governmental agencies for very specific purposes. (IRS tax audit for example.)

While the cost data supplied by the Anaconda Company are not complete, they are similar to industry-wide cost accounting information. These data allow only a general comparative evaluation of the Columbia Falls plant in relation to the rest of the aluminum industry.

Purchases

ALUMINA

The key raw material for making aluminum by the electrolytic conversion process used at the Columbia Falls plant is alumina, an oxide of aluminum produced from the basic ore, bauxite. Anaconda transports this product by ship from a jointly owned Anaconda-Kaiser bauxite mine and alumina refinery in Jamaica to Everett, Washington, and by railroad hopper car to Columbia Falls. The Columbia Falls plant used 583,166,991 pounds in 1973, valued at \$21,612,517 or 3.7 cents per pound F.O.B. the plant.

In an analysis of the aluminum industry it was shown that the 1968 cost of delivered alumina per ton was from \$45.00 (2.25¢ per pound) to \$70.00 (3.50¢ per pound) in the Free World.¹ The Anaconda Company reported 1973 delivered cost, F.O.B. Columbia Falls, of 3.7¢ falls near to the 1968 cost per pound range of 2.25¢ - 3.50¢.

Assuming the aluminum industry experienced a moderate rise in the cost of alumina over the last six years, the industry-wide data would indicate the Anaconda plant is a moderate to high cost purchaser of the product. However, since alumina is purchased within operating divisions of the Anaconda Aluminum Company its actual cost may be different from that reported at the Columbia Falls plant.

Generally, there are several considerations which may affect the relative cost of this product to the Anaconda Columbia Falls plant. Bauxite to alumina conversion costs of production in the Caribbean area (where Anaconda produces its alumina) were below those in the U.S. and Europe.² These costs were lower in vertically integrated companies (like Anaconda), than in companies who purchased it on the open market.³ The

¹"Profile of an Industry-Aluminum," Metals Week, (Part 6, Dec. 16, 1968, P 200A)

²Ibid

³Ibid, 201A

Pacific Northwest Aluminum Industry was traditionally at a regional disadvantage in the purchase of alumina because of high transportation costs, but the disadvantage was decreasing as aluminum producers used larger ocean-going ships and railroad hopper cars.⁴ Generally the Pacific Northwest has been a high cost alumina area, but the Anaconda Company enjoys several cost advantages which make its costs of this product, F.O.B. Columbia Falls, competitive with those of other domestic producers.

FLUORIDE, CRYOLITE, ANODE PASTE MATERIALS AND ALLOYS

All of these materials are used in the aluminum smelting process and are purchased from sources either outside of Montana or outside the U.S. The value of these purchases was \$9,648,954 in 1973. This cost, on cost per pound of output basis represented 3.19¢ of the total 19.5¢ cost of a pound of aluminum produced at Columbia Falls in 1973.

The 1968 Metals Week industry-wide cost range for similar or equivalent products was 2.54¢ to 3.10¢ per pound of output.⁵ While the Anaconda 1973 costs per pound fell near this range, current industry-wide cost data on the materials were not available.

⁴Pacific Northwest Economic Base Study for Power Markets-Aluminum,
U.S. Department of Interior, Bonneville Power Administration, 1967,
Vol II, Part 7B, P. 251

⁵Supra, 201A

ELECTRICAL POWER

The cost of electrical energy is the single most important consideration in the location of a primary aluminum reduction facility. The Anaconda facility in Columbia Falls was built to minimize the cost of electrical energy since the plant is linked by an 8.5 mile electrical power transmission line to the Hungry Horse hydro-electric generating plant.

While the Hungry Horse plant is a primary electrical energy supplier to Anaconda, the Bonneville Power Administration (BPA) must bring power from other sources in the Pacific Northwest to supply the Anaconda plant. The yearly average kilowatt hour production (1966-71) at Hungry Horse Dam was only 954,380,000 kwh. The Anaconda Company in Columbia Falls purchased 2,703,389,760 kwh from the BPA and other power companies in 1973. BPA power was sold to the Columbia Falls plant at a rate of 1.87 mills per kwh in fiscal year 1973. The total cost of power from all power companies was \$7,281,246 or 2.63 mills per kwh in 1973.

Over the years the Anaconda plant in Columbia Falls has enjoyed lower power costs than other aluminum producers in the Pacific Northwest. In 1963 the BPA reported the price of power paid by Anaconda to the BPA at 1.66 mills per kwh.⁶ In the same year the Reynolds Aluminum plant in Troutdale, Oregon, paid 2.48 mills, the Kaiser plant in Spokane, Wash-

⁶Supra, P 145

ington, 2.02 mills and Alcoa in Vancouver, Washington, 2.07 mills per kwh. The Troutdale plant paid 49% more for power and the other plants, over 20% more than the Columbia Falls facility. The Harvey Aluminum plant in the Dalles, Oregon paid exactly the same average rate as Anaconda.

The other domestic U.S. primary aluminum producing facilities are found in low cost of power areas. The Tennessee Valley Authority (TVA) area is one such area. The BPA study reported the Alcoa plant in Alcoa, Tennessee paid an average price per kwh of 4.69 mills, 183% above Anaconda's power costs. The Alcoa facility in Evansville, Indiana, using energy generated from coal-fired plants, had an estimated cost per kwh of 3.5 mills, 110% above Anaconda's cost.

The Pacific Northwest's power costs are not only the lowest in the U.S., but are on a par with the lowest costs throughout the world. The Metals Week study showed power costs in Japan were in excess of seven mills, in 1968 in Central Europe 4.0-6.0 mills and in Norway, Canada and Africa from 2.0 to 3.0 mills per kwh.⁷

Thus, with current BPA power costs only 0.26¢ mills per kwh above 1963 BPA costs, it appears that the Anaconda Company in Columbia Falls continues to enjoy considerable competitive advantage over other domestic aluminum producers in this most important cost variable.

⁷Supra, P 201A

TABLE 4

Purchases from Flathead County Suppliers
Ranked by size of purchase

Montana Power Co.	Natural Gas
Gerald Newbury	Wood Products
Industrial Supply Co.	Tools and repairs
Courtesy Motors, Inc.	Automotive repairs
Flathead Travel Service	Travel
Northwestern Telephone	Telephone
Rollie's Machine Works	Fabricated steel products
Eastman's Mill	Wood products
Valley Motors, Inc.	Engine repairs
Sunset Carb. & Elect.	Engine repairs
Plum Creek Lumber Co.	Wood products
Glacier Equipment Co.	Equipment repairs
Pacific Hide & Fur	Steel goods
McElroy & Wilken, Inc.	Concrete
Daley Tire Service	Automotive repairs
Western Diesel Power	Diesel repairs
Treasure State Electric Co.	Electrical Motor Repairs
Bomar Office Supply	Office goods
Columbia Falls Clinic	Medical services
Todd's Cafe	Food
Carl Weissman & Sons	Steel
North West Machine Supply Co.	Machinery supplies
Palmer Bros. Auto	Automotive repairs
Treasure State Equipment Co.	Equipment repairs
L. P. Gas Service	L. P. Gas
Day Equipment Co.	Equipment repairs
A & M Communications	Electrical repair
Louisiana Pacific Co.	Wood products
Bergsieker Refrigeration	Equipment repair
C & C Supply, Inc.	Automotive repair
Far West Gas & Oil	Gas-Oil

Source: Anaconda Columbia Falls Plant

FUEL, OPERATING SUPPLIES, MAINTENANCE SUPPLIES, POT
REBUILD MATERIALS, OTHER MATERIALS AND SUNDRY

The total 1973 value of these materials was \$5,432,271. They represented a cost of 1.79¢ of the total cost of a pound of aluminum produced at Columbia Falls. Metals Week reported industry-wide costs of these items per pound of aluminum in 1968 from 0.75¢ to 1.00¢ per pound.

The Columbia Falls plant is unique in that it does more internal maintenance of capital items, like potlines, than most primary aluminum plants. This is primarily due to the plant's distance from a major industrial area. Unit costs in this category, and in labor costs as well are higher because Anaconda internalizes these functions.

Some 14%, or \$780,748 of the materials in this category were purchased from local businesses in Flathead County. (See Table 5) While an exact count of the number of employees dependent on Anaconda purchases was not made, a considerable number of employees and their earnings are dependent on Anaconda's local Montana purchases.

TABLE 5

Purchases from Suppliers in Montana
outside of Flathead County
Ranked by size of purchase

Montana Blue Cross - Great Falls	Medical Insurance
Montana Hardware - Butte	Operating materials
Chevron Oil - Billings	Oil and gas

Source: Anaconda Columbia Falls Plant

TRANSPORTATION

Rail transportation is a very important cost of production in the Anaconda Columbia Falls operation. While important to the company, the cost of inbound and outbound Anaconda items represents a significant contribution of the local area economy. The cost of inbound items was \$5,028,751 and outbound \$4,567,886 in 1973. The largest portion of this \$9,595,637 in rail revenue would accrue to Burlington Northern.

The total cost of various purchases included freight cost, F.O.B. Columbia Falls; therefore, a transportation cost breakdown by type of purchase was not possible. Generally, all out of state product purchases at the Columbia Falls plant have a transportation cost disadvantage in relation to other Pacific Northwest Aluminum Producers, by virtue of distance from the west coast. Sales to the California market would also be at a transportation cost disadvantage in competition with other Pacific Northwest producers.

In terms of market transportation costs, the plant is at a substantial competitive disadvantage. Current transportation costs of Columbia Falls aluminum to market are \$30.13 per ton (1.5¢ per pound). The 1967 BPA study found Ohio Valley market transportation costs to Chicago area markets at \$5.85 per ton of aluminum ingot and Tennessee Valley market transportation costs at \$14.20 per ton.⁸ At that time the

⁸Supra, P 280

Pacific Northwest aluminum producers shipped their aluminum ingot to the Chicago market at \$21.46 per ton. However, of the Pacific Northwest aluminum producers, the Columbia Falls plant has some rail transportation advantages to the midwest market area.

VALUE ADDED

The term describes the value of product created from any, or all productive endeavors in an economy. The value added by the Anaconda Columbia Falls aluminum plant to the Flathead gross county product, or the Montana gross state product or the United States gross national product (GNP), equals the sum of total labor costs, interest paid, gross corporate profits (before income taxes and dividends), capital consumption allowances, and indirect business taxation. Gross product originating in the Anaconda plant is the total value added to an economy based on the income method of national income and product accounting. Anaconda income and expense data did not allow for a total accounting of value added, but were complete enough to provide a measure of contribution to personal income.

TOTAL LABOR COSTS

Labor costs include wages and salaries paid as well as employer fringe benefit costs (health, retirement, vacation, etc.). In 1973 the Columbia Falls plant paid \$9,859,333 in wages and salaries, and \$2,237,479 in fringe benefits. The total labor costs were \$12,096,812 and they represented a cost of 4.0¢ per pound of aluminum produced at Columbia Falls.

LABOR COSTS PER UNIT OF OUTPUT

In the Metals Week article industry-wide labor costs per unit of output were from 2.25¢ to 3.00¢ in 1968.⁹ Industry-wide labor costs adjusted for wage increase in the primary metals manufacturing industries, 1968-73, would put 1973 industry-wide labor costs at 3.17¢ to 4.22¢ per pound of aluminum.¹⁰ Thus, 1973 Columbia Falls labor costs per pound of aluminum of 4.00¢ fall in the medium to high industry-wide cost of labor range.

INTEREST PAID

Interest on the Columbia Falls plant debt was not provided.

GROSS CORPORATE PROFITS

Anaconda's gross corporate profits (exclusive of a profits tax liability) was not provided.

CAPITAL CONSUMPTION ALLOWANCES

The Anaconda Columbia Falls plant had a book value depreciation cost of \$5,739,894 in 1973.

INDIRECT BUSINESS TAXATION

The company paid \$1,349,419 in 1973 in Flathead County real estate and property taxes.

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⁹Supra, 201A

¹⁰Labor costs were adjusted using Bureau of Labor statistics, gross average hourly earnings in the Primary Metals manufacturing industry.

Sales

In 1973 the Anaconda Aluminum plant in Columbia Falls produced 151,471 tons of aluminum. However, the plant transferred, or sold, 151,600 tons; the difference, 129 tons, was taken from inventory. The Columbia Falls plant almost exclusively "sells" to the Anaconda fabricating works in Terre Haute, Indiana.

The Flathead County plant produces sheet, wire, pig and rod aluminum ingot. In 1973 wire ingot was shipped to Great Falls, Montana Wire and Cable works, however, with the closing of that facility the wire ingot will now be leaving the state.

The 1973 "sales" tonnage was 17.8% below the 1972 tonnage. This reduction was in response to the Pacific Northwest energy crisis in which the company shut down one of its aluminum "potlines".

The sales value of the transferred aluminum was reported at \$64,823,860, 14.3% below the previous year. The sales value per pound of aluminum was 21.4¢ for 1973. The current open market primary ingot price is 29¢ per pound, which is regarded as an aluminum fabricator's wholesale price. Currently, the retail price of fabricated aluminum products, like foil, is close to \$1.00 per pound.

The reported sales value is determined by contract pricing from the Anaconda Aluminum home office in Louisville, Kentucky. Interestingly, the sales value of output very nearly approximates the total cost of production. For these reasons the sales value of "sold" Columbia Falls aluminum appears to reflect largely intra-company pricing policy.

Summary

ANACONDA AND THE ALUMINUM INDUSTRY

The Anaconda Columbia Falls company data prohibits any substantive conclusion about the profitability of the plant, but it does provide the basis for a cost of production comparison. From the Anaconda cost data and data from other industry sources it appears that the Columbia Falls plant has substantial competitive cost advantages in some sectors, while in other cost areas, advantages are less pronounced and still other cost sectors, there are distinct disadvantages. On balance, using low-medium-high cost of production range, the Columbia Falls plant would rank in the medium to high cost of production range, vis-a-vis other U.S. primary aluminum producers.

While the cost of production is important when considering the viability of the plant, another equally important consideration is the current supply, demand and price of the plant's product. The primary aluminum industry is currently operating at 100% capacity, subject to power supply considerations. The demand for every pound of product is exceedingly strong, with customers in many cases struggling to line up supplies. The prices of aluminum ingot, while subject to Cost of Living Council constraint, have been strong and rising over the last few years.

Prior to 1973 the Anaconda Aluminum Company had been a net purchaser of primary aluminum on the open market. Generally, this situation does not maximize profits in a vertically in-

tegrated company like Anaconda. Consequently when the company brought the new Sebree, Kentucky (120,000 tons) primary aluminum facility on stream it became a net seller of primary aluminum. Operation of the Sebree and Columbia Falls plants at capacity should contribute to the company's ability to maximize its profit potential in the aluminum industry.

PURCHASES

Anaconda reported the total cost of purchases at \$45,571,030 in 1973. The largest local purchase was the \$7,281,246 purchase of electrical power. The Columbia Falls works purchased an additional \$1,308,943 from Montana businesses, mostly Flathead County jobbers. However, some of these purchases came from small manufacturing operations in Flathead County.

Another local service sector tied closely to the Anaconda operation is the transportation industry. The cost of inbound and outbound transportation services was over \$9 million in 1973.

Employment and earnings effects from all these local purchases are significant in the Flathead County economy. Quantitatively, these effects are part of the indirect effects summarized in the without model of the community economic analysis section.

